TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

PTR SECTION STAFF GUIDANCE

RAINWATER HARVESTING

Rule Affected: Title 30 Texas Administrative Code (30 TAC) §290.44(j).

Background:

Harvested rainwater is classified as surface water that can either be land-based or roof-based. Land-based rainwater harvesting is when rainwater runoff from the land is collected into small impoundments before it reaches a watercourse, river, or stream. Roof-based rainwater harvesting is when the rainwater that falls is collected on a roof before the water reaches the ground. The Texas Commission on Environmental Quality's (TCEQ) rules for public drinking water only apply to a public water system that supplies rainwater as potable water. This guide offers a general overview of the TCEQ rules that apply to public water systems that use rainwater as a drinking water source, in food-manufacturing facilities, and as a source for a commercial bottling operation.

Guidance:

General Requirements

These design and operational regulations are to ensure the public water system is able to supply their customers with adequate quantities of potable drinking water at flow rates that meet their needs. The TCEQ requires a written letter of any plans for a public water system to use rainwater as a source for drinking water with a brief description and location of the proposed public water system or the proposed changes to the existing public water system. The collection, treatment, storage, and distribution facilities at a public water system must be designed by a Professional Engineer licensed in the State of Texas. The engineering report, plans, and specifications must be submitted to the TCEQ to determine if the facilities can reliably supply adequately treated drinking water. Detailed information about the general requirements which must be met before beginning construction of a public water system facility can be found in 30 TAC §290.39.

Collection and Treatment

Rainfall varies significantly across Texas, and the design of each collection system must be evaluated on a site-specific basis. However, there are some general guidelines that apply to all systems, such as:

- The collection system should be designed so that the first part of each rainfall is collected in a separate storage tank for nonpotable use or discarded.
- Specialized treatment facilities that will not meet the conventional design standards are needed to treat rainwater. An exception to TCEQ's standard design

requirements should be obtained, and the engineer should specify treatment technologies which achieve the required level of public health protection. Most designs will:

  - Use a filter that is capable of removing at least 99% of the particles that are 3.0 microns of larger in diameter;
  - Include a disinfection system (such as chlorine, ozone, or ultraviolet light) that is capable of inactivating at least 99.99% of the viruses that might be present in the untreated water and provide a residual; and
  - Be large enough to treat an adequate quantity of water to meet the customers' maximum daily demands at any time of the year.

- Bottling rainwater requires that all TCEQ treatment requirements are met before the water enters the bottling process. Any treatment during bottling must occur after the water has already been deemed fit for human consumption.

Storage and Distribution

The design and construction of the storage and distribution facilities must meet the standards adopted by the American Water Works Association and our other regulatory requirements, including the TCEQ design requirements for storage and distribution systems located at 30 TAC §290.43 and §290. 44, respectively.

The TCEQ requires all treated water to be disinfected before entering the storage tank and to maintain a disinfectant residual in the tank and throughout the distribution system. Chlorine-bleach solution is recommended to disinfect water in a system where rainwater is the only source of treated water. Treated rainwater blended with other treated water that contains chloramines may require the use of another disinfectant (or combination of disinfectants) to avoid taste and odor problems caused by mixing chlorinated and chloraminated waters.

Minimum Capacity Requirements

Minimum capacity requirements for the production, treatment, storage, and pressure maintenance facilities can be found in 30 TAC §290.45 and assure that the public water system is able to provide adequate quantities of drinking water. Some systems use less potable water than others and, based on site specific demands, would need to request an exception to the minimum requirements found in 30 TAC §290.45 to meet an alternative capacity requirement. Some underlying principles that control the capacity of the rainwater collection, treatment, storage, and pressure maintenance facilities are:

- The roof and storage reservoir must be large enough to capture and store enough untreated water to provide an adequate reserve during periods when there is limited rainfall;
- The treatment facilities (or the combination of all the treatment facilities if rainwater is a supplement to other sources of treated water) must be capable of treating enough water to meet customers' maximum daily demands on the day when they use the most water; and

- The treated water storage and pressure maintenance facilities must be capable of meeting customers' peak demand during the time of the day when the most water is used.

Operations and Maintenance

All public water systems that treat surface water must be under the direct supervision of a water-works operator who holds a Class C or higher surface water license. If the treatment system uses cartridge or membrane filters, other Class C water-works licenses are acceptable as long as the operator has completed surface water training and is familiar with the monitoring and reporting requirements for surface water systems. The licensed operator must be present at the plant whenever it is treating water, or else the plant must be equipped with continuous monitors, alarms, and shutoffs to assure that a malfunction does not occur when the operator is not present. The operator does not have to be at the plant when rainwater is being harvested from the roof or when treated water is being delivered to the customers.

Rainwater sources must meet the same monitoring and reporting requirements as all other public water systems that use surface water sources.

Other matters that must be addressed when developing and operating a public water system with rainwater as a source include:

- The submittal and approval of a CT Study for the system;
- The development and implementation of an effective cross-connection-control program to ensure that drinking water is not re-contaminated after it has been treated;
- Maintenance of a complete record of operations including copies of SWMORs, the results of any bacteriological and chemical tests conducted, calibration records for laboratory instruments, flushing records, and maintenance records;
- Preparation of a monitoring plan that identifies where compliance samples are the be collected, how frequently the tests must be conducted, who will run the tests, the analytical methods and equipment used, and how compliance will be determined;
- Writing an operations and maintenance manual that describes how your system is designed, operated, and maintained;
- Implementation of an effective corrosion-control program, which is especially important for rainwater which can be very corrosive if not properly treated; and
- Maintenance of a supply of critical parts, equipment, and reagents; typically including chemical-feed equipment, replacement cartridges for a cartridge filters, a spare turbidimeter, other essential laboratory equipment, calibration standards, and reagents for laboratory instruments.

A comprehensive list of TCEQ's operational requirements can be found at 30 TAC §290.46.

Drinking-Water Quality

Most of the contaminants present in roof-based harvested rainwater are introduced during its collection, storage, and distribution. The TCEQ regulates more than 100 different constituents and requires public water systems to monitor for these and other contaminants that can be present in drinking water. There are two major regulated categories of organic chemicals:

- Volatile organic chemicals, which are contaminants that are typically introduced when water comes into contact with materials containing refined organic products; and
- Synthetic organic chemicals, which are typically found in pesticides, herbicides, and similar manufactured products.

There are two regulated categories of inorganic chemicals:

- Minerals, which do not pose a public-health threat but are regulated because they degrade aesthetic qualities; and
- Metals, which may degrade aesthetic qualities or pose a public-health threat in high enough concentrations.

Coliform bacteria are tested for as a surrogate for pathogenic bacteria.

Pathogenic viruses or parasites are difficult and expensive to test for, and a minimum treatment technique requirement has been established to help assure that the treated drinking water is free of these public-health threats. Requirements covered in *Operations and Maintenance* help ensure that the treatment processes are effective against pathogens that can be introduced during collection and storage of rainwater.

Some additional rules regarding drinking water that a public water system must comply with include:

- 30 TAC 30, Subchapters A and K: requirements for certification of water-works operators (TCEQ's Operator Licensing Section – 512-239-6133)
- 30 TAC 293: requirements for water districts (Utilities and Districts Section – 512-239-4691 and utildist@tceq.texas.gov)
- 30 TAC 290, Subchapter E: fees for public water systems (Public Drinking Water Program – 512-239-4691 and pdws@tceq.texas.gov)
- 30 TAC 297: requirements for water-rights permits (Water Rights Permitting Team – 512-239-4691)

Finalized and Approved by:

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If no formal expiration date has been established for this staff guidance, it will remain in effect until superseded or canceled.

Revision History:

Date	Action	Action by
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